MICROSWITCH

FIELD OF THE INVENTION

The present invention generally relates to microswitches, more particularly to a microswitch that provides several operating directions for opening/closing an electric switch.

BACKGROUND OF THE INVENTION

In view of the low precision for manufacturing and assembling "small switches" as disclosed in the R.O.C. Patent Publication No. 517254 and "lever switches" as disclosed in the U.S. Publication No. 2002/0148714, the inventor of this invention had made improvements over the foregoing prior arts and filed a R.O.C. patent application entitled "Microswitch (II)". Such patent application granted and published with Publication No. 562228 discloses an easy-to-assemble and easy-to-manufacture microswitch without changing the dimensions of existing products or requiring a complicated manufacturing process or strict precision control. The easy-to-assemble and easy-to-manufacture microswitch comprises a connecting section disposed between first and second conductive sections of a resilient component used for opening/closing an electric switch, a fixing section coupled to the resilient component and disposed in an accommodating groove of a press button at the position corresponding to the connecting section, so that the first conductive section of the resilient component is kept

constantly in contact with a first contact section of the first conductive terminal extended into a chamber, and the second conductive section is moved downward by a force produced by pressing on a pressing section of the press button at a position corresponding to the contact of the press button with a second contact section of the second conductive terminal being extended to the chamber.

Although the switch according to this patent has solved the precision problem, it still cannot meet the strict requirements of the microswitch such as the distance required for the signal connection and the quick restoration of the press button after being released mainly due to the parallel arrangement of the first and second conductive terminals disposed in the chamber of the main body. Therefore, the distance required for signal connections is limited by the provided space. In addition, the distance between the first and second conductive sections of the resilient component is short, as shown in the drawings of the patent specification. Thus the compression produced by the press button is limited, and the press button cannot quickly resume its original position after being released.

SUMMARY OF THE INVENTION

The primary objective of the present invention is to overcome and avoid the foregoing shortcomings. This invention provides a microswitch that is easy to assemble and manufacture. The microswitch of this invention constantly

keeps the first conductive section of a resilient component for opening/closing an electrical switch in contact with the first conductive terminal in the main body of the microswitch, and houses a plate-shaped second conductive section with a contact surface inside the main body of the microswitch, so that the second conductive section of the resilient component is driven by a press button on the contact surface of the second conductive terminal to preset the signal from an initial connection state to a final connection state in order to increase the distance required for controlling the signal connection and allow the resilient component to have an effective deformation and provide the best resilience of the press button.

BRIEF DESCRIPTION OF THE DRAWINGS

FIG. 1 is a perspective diagram of the present invention.

FIG. 2 is a view of the disassembled parts of the structure of the present invention.

FIG. 3 is a cross-sectional view of the section 3-3 in FIG. 1.

FIG. 4 is a cross-sectional view of the section 4-4 in FIG. 3.

FIG. 5 is a top view of the assembly of the present invention.

FIG. 6 is a side view of the assembly of the present invention.

FIGS. 7A, 7B, and 7C are illustrative views of the movements made when a force is acted from the left side in the vertical plane.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENTS

To make it easier for our examiner to understand the objective of the present invention, its structure, innovative features, and performance, we use a preferred embodiment together with the attached drawings for a detailed description of the invention.

Please refer to FIGS. 1 to 4 for the present invention. The microswitch of the invention comprises: a main body 10 having a chamber 11 therein; a first conductive terminal 50 and a second conductive terminal 40 disposed on the chamber, and the first and second terminals 50, 40 being vertically disposed in the chamber 11; a press button 20 disposed in the chamber 11 for supporting and allowing free rotation on the main body 10; a force acting section 21 disposed at the bottom of the press button 20 for providing an elastic force to push the press button 20 up and protruded from the main body 10; and a resilient component 30 having a first conductive section 32 and a second conductive section 33 for contacting the first conductive terminal 50 and the second conductive terminal 40 respectively, wherein the first and second conductive sections 32, 33 of the resilient component 30 bent to define a first electric connection end 321 and a second electric connection end 331, and the first electric connection end 321 and a second electric connection end 331 being bent perpendicularly; a circular hole 132 disposed on both sides of the main body 10 corresponding to a fixing section 22 of the press button 20,

and an accommodating groove 131 extended from the circular hole 132 to an open end 111 of the chamber 11, and the accommodating groove 132 being tapered from the open end 111 to the circular hole 132; an opening 121 disposed on a sidewall 12 of the main body 10 proximate the circular hole 132 and being extended to the open end 111 of the chamber 11; an aslant conductive connecting surface 221 being formed at the lower edge of the fixing section 22 of the press button 20.

Further, an assembling section 31 formed between the first and second electric conductive sections 32, 33 of the resilient component 30. An accommodating groove 23 disposed on the push button 20 at a position corresponding to the assembling section 31 comprising a fixing section 22 for connecting the resilient component 30. The first conductive section 32 and the first conductive terminal 50 of the resilient component 30 are kept constantly in contact with each other, and the second conductive section 32 is pushed down by a force provided by pressing the press button 20, and the contact surface 41 of the second conductive section 33 and the second terminal 40 should satisfy the conditions for the initial signal connection state to the final signal connection state preset by the microswitch.

From FIGS. 5, 6, and 7A, it is obvious that the second conductive terminal 40 in a plate shape is disposed in a chamber having a contact surface 41, and the bent second

electric connection end 331 of the second conductive section 33 of the resilient component 30 disposed on the top of the contact surface 41. When the press button 20 is pushed from the left direction or the vertical plane, the press button 20 will rotate and shift downward by making use of the fixing section 22 as the fulcrum, and drive the second conductive section 33 of the resilient component 30 to move down simultaneously. Since the first conductive section 32 of the resilient component 30 and the first conductive terminal 50 are always in contact with each other, therefore when the press button 20 moves to the highest point, the second electric connection end 331 of the second conductive section 33 is coupled to the contact surface 41 of the second conductive terminal 40 to define the initial signal connection state as shown in FIG. 7B; when the press button 20 moves to the lowest point, the contact surface 41 of the second conductive terminal 40 satisfies the requirements for depression distance of the press button 20, so that the second electric connection end 331 of the second conductive section 33 can keep the contact area 41 in an electric connection state when the press button 20 is depressed as shown in FIG. 7C. Therefore, when the press button 20 moves to the lowest point, it defines a final signal connection state, and the signal traveling distance from the initial signal connection state to the final signal connection state can meet the actual moving distance design of the press

button 20. The microswitch of the present invention provides the best design for the signal traveling distance. Further, since the current of the microswitch is very small, therefore when the second electric connection end touches the contact surface 41 it does not produce any spark, and does not cause danger or accidents.

Further, FIGS. 7A to 7C obviously show that the distance between the first conductive section 32 of the resilient component 30 and the second conductive section 33 is larger than the traditional microswitch. Therefore, when the press button 20 moves to the lowest point, the stored resilience of the resilient component 30 is increased; and when the press button 20 is released, the press button 20 can resume its position quickly, and effectively release the signal connection state.

While the invention has been described by way of example and in terms of a preferred embodiment, it is to be understood that the invention is not limited thereto. To the contrary, it is intended to cover various modifications and similar arrangements and procedures, and the scope of the appended claims therefore should be accorded the broadest interpretation so as to encompass all such modifications and similar arrangements and procedures.